Understanding the Plant Analysis Report

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Healthy plants contain predictable concentrations of the elements (nutrients) required for normal growth and development. Plants need primary nutrients (N, P, K) in greatest quantities, secondary nutrients (Ca, Mg, S) in lesser quantities and micronutrients (Fe, Mn, Zn, Cu, B, Mo, Cl) in very small amounts (Table 1). Plants get all these nutrients from fertilizer and/or the soil. Three other elements that plants need—hydrogen, oxygen and carbon—come from water and the atmosphere.

Standard plant analysis measures concentrations of 11 essential elements (N, P, K, Ca, Mg, S, Fe, Mn, Zn, Cu, B). Additional tests can be requested to measure Cl and Mo. Concentrations of primary and secondary nutrients are reported as percentages; micronutrient concentrations are reported in parts per million (ppm). The plant analysis report also presents results as index values that make it easy to interpret results in terms of plant health and productivity. The concentration for each element is converted into an index value (0–124), which falls into one of five interpretative categories (Figure 1).

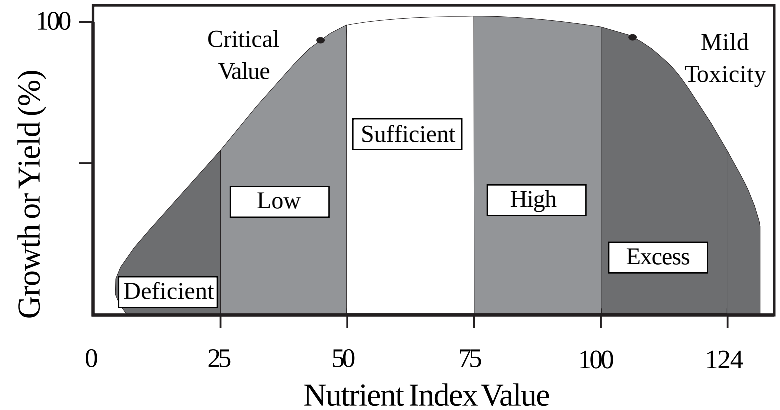

Figure 1. Nutrient Index Interpretation Scale

An index of 50–74 indicates that the nutrient concentration is *sufficient* for optimum growth and yield. *Low* (25–49) and *deficient* (0–24) index values indicate that the nutrient concentration is below the desired level and may be contributing to reduced growth, yield and/or quality. In such cases, supplying that nutrient to the crop at the optimum time and under optimum environmental conditions will result in an increase in growth and/or yield (Table 2).

Values in the *high* range (75–99) are not normally detrimental to growth or yield but, under some circumstances, may negatively impact crop quality. When values are in the *excess* (100+) range, growth problems may result due to nutrient imbalances or, in the case of micronutrients, toxic reactions. Values above 75 may indicate overfertilization and poor allocation of resources.

The critical value indicates the point at which a nutrient shortage causes a 5 to 10% loss in yield or growth; the point of mild toxicity indicates the same degree of loss due to nutrient excess. As the index decreases below the critical value or increases above the mild toxicity point, growth or yield will continue to decrease proportionately. The N:S, N:K and Fe:Mn ratios listed on the report indicate degree of balance among some essential elements.

Table 1. Nutrient abbreviations

N	Nitrogen	**Fe**	Iron	**Cl**	Chloride
P	Phosphorus	**Mn**	Manganese	**Na**	Sodium
K	Potassium	**Zn**	Zinc	**Ni**	Nickel
Ca	Calcium	**Cu**	Copper	**Cd**	Cadmium
Mg	Magnesium	**B**	Boron	**Pb**	Lead
S	Sulfur	**Mo**	Molybdenum	**NO_3-N**	Nitrate nitrogen

Table 2. Expected response to nutrient applications

Index	0–24	25–49	50–74	75–99	100–124+
Interpretation	Deficient	Low	Sufficient	High	Excess
Crop Response	High	Medium	Low	None	None